Ministry of Environment, Forest and Climate Change
Government of India

INDIA COOLING ACTION PLAN

Operationalizing Domestic Manufacturing and Production Sector Recommendations

Overview of ICAP

Cooling requirement is cross sectoral and an essential part for economic growth. There is considerable use of cooling in different Sectors of the economy such as industries, residential and commercial buildings, cold chain, transport (personal, commercial, metro and railways, ships). With growth of economy there is rapid increase in cooling demand and need for air conditioning. Hydrochlorofluorocarbons (HCFCs) and Hydrofluorocarbons (HFCs) are used as refrigerants in air conditioning and as blowing agents in insulation foam manufacturing. Under the Montreal Protocol, phase out of HCFCs is underway. Under the Kigali Amendment to the Montreal Protocol, Hydrofluorocarbons (HFCs) need to be phased down as per the agreed schedule. Integrated actions with respect to cooling across sectors will have a higher impact than either of the actions taken in isolation. This would have significant climate benefits.

Within this context, the development of the India Cooling Action Plan (ICAP) has been a multi-stakeholder, integrated and consultative process to synergize actions for addressing the cooling demand across all sectors. The ICAP provides a 20-year perspective (2017-18 to 2037-38) and recommendations, to address the cooling requirements across sectors and ways and means to provide access to sustainable cooling. ICAP is the first-of-its-kind initiative in the cooling sector to be taken by any country in the world, which exemplifies integrated approach and underscores the urgency of proactively and collaboratively addressing its cooling growth. The ICAP development process demonstrated high inter-ministerial and cross-sectoral collaboration in laying out actionable pathways to provide sustainable cooling to meet cooling needs while neutralising its negative impacts. It strikes a balanced approach to goal setting by establishing high-level nationwide targets but allowing the line ministries flexibility in setting their tar gets within a directional framework of recommendations.

Goals of ICAP

Development Framework

For the development of the ICAP, working groups were constituted for mapping the following thematic areas:

a) space cooling in buildings, air-conditioning technology,
b) cold-chain and refrigeration,
c) transport air-conditioning,
d) refrigeration and air-conditioning service sector,
e) indigenous production of refrigerants, and
f) research and development.

It was ensured that every working group had adequate representation from the Government (Ministries and related government entities), Industries (manufacturers, refrigerant producers, and industry associations), and the Knowledge sector (research institutions, academia and civil society organisations) to obtain triple-sector alignment, right from the start.

Inter-ministerial Coordination

A Steering Committee with Representatives of various ministries was constituted for guiding and reviewing the documentation, reports, and recommendations developed by th ICAP thematic working groups.

An Inter-ministerial committee comprising subject matter experts, eminent representatives of think tanks, and industry representatives was also formed under the chairpersonship of the Secretary, MoEF&CC to oversee the development process. These Committees helped dovetail the recommendations of te ICAP with ongoing and planned policies and programmes residing with different ministries.

Dovetailing existing Policies and Priorities

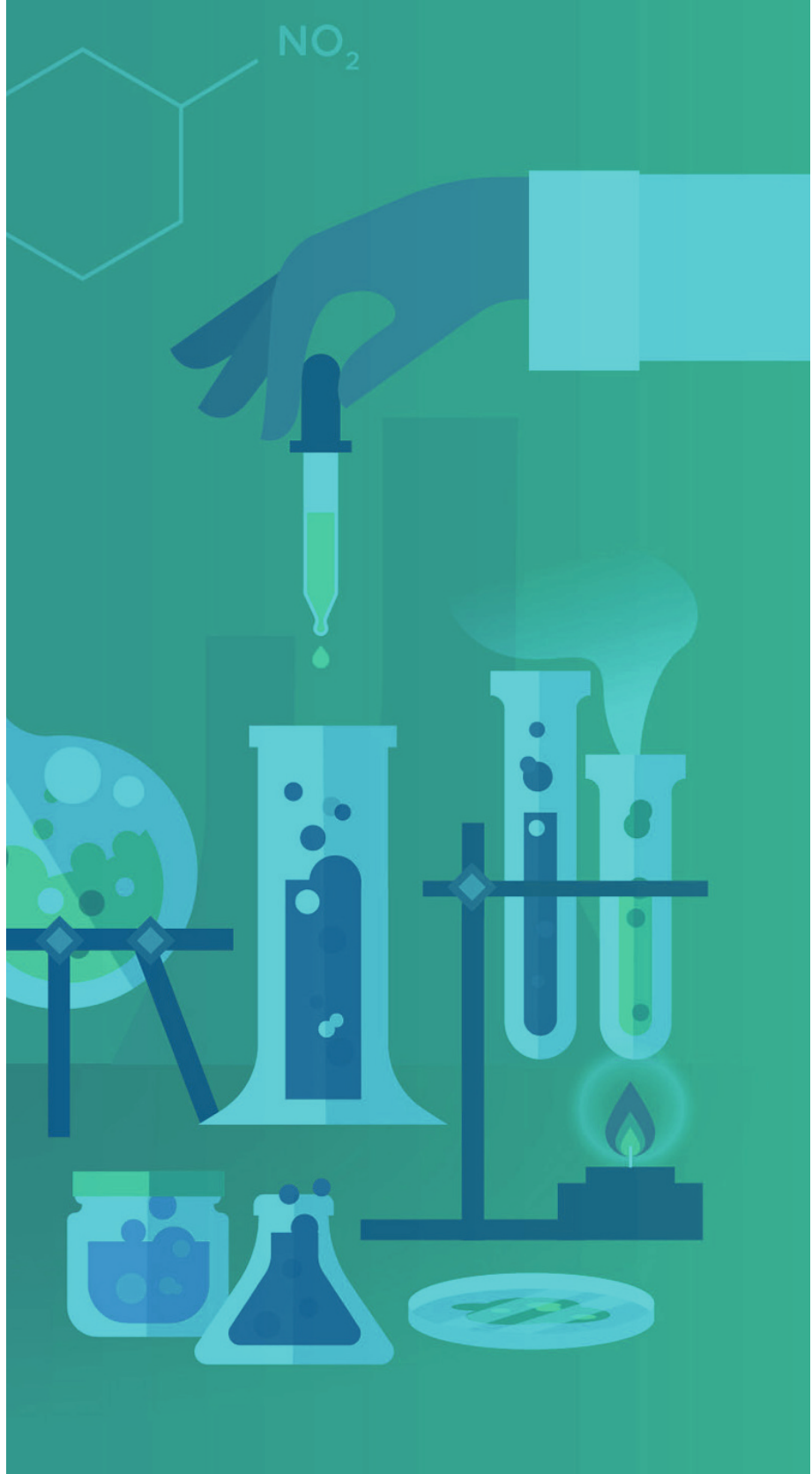
The ICAP recommendations were deeply embedded within the context of the Kigali Amendment to the Montreal Protocol i.e. refrigerant transition towards more climate-friendly refrigerants.

ICAP also highlighted Refrigerant demand and indigenous production as a thematic area. Since the Kigali Amendment to the Montreal Protocol, India has embarked on drawing a perspective plan for indigenous development of refrigerants for use in different sectors, foaming agents and other cooling technologies.

Overview of Refrigerant demand and indigenous production

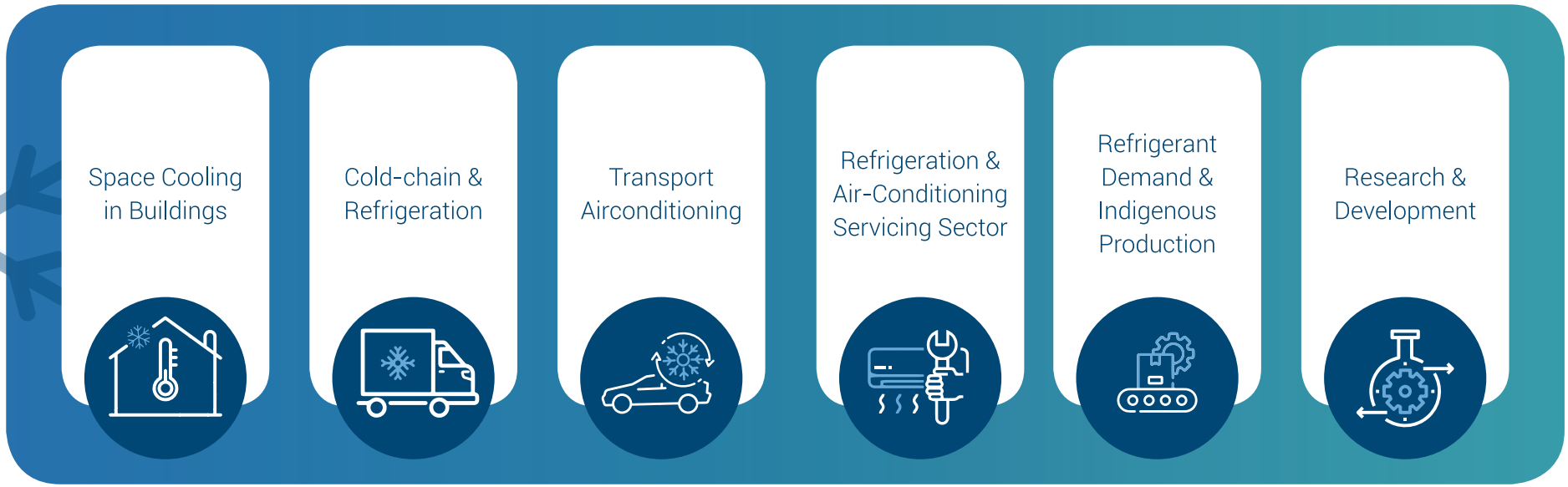
The fluorocarbon refrigerant gas producer industry in the country played a vital role in making India self-reliant in the development and production of fluorocarbon refrigerants, thereby contributing to the economic development of the country. The industry also exports to several other countries and provides employment, directly or indirectly, to many people. Refrigerant production facilities are capital intensive and the fluorocarbon manufacturing industry globally decide on such large investments considering the life cycle of the refrigerants guided by present and future regulatory framework. Indian fluorocarbon industry has also made such investment decisions on setting-up production facilities which have enabled India to be self-sufficient in the availability of refrigerants.

India was relatively a small player in production of refrigerant gases in the past. However, India has gradually increased its presence in international markets and has now emerged amongst the top three refrigerant producing nations of the world. Over the years, Indian fluorocarbon industry has improved their technological capability in indigenous development of production processes including new generation low-GWP refrigerants such as HFOs and blends of HFOs and HFCs. This industry has shown results and is expected to continue to strive for self-sufficiency in indigenous refrigerant development and production of low/zero GWP alternative refrigerants.



Operationalization of Recommendations

To operationalize the recommendations of ICAP, MoEF&CC has decided to constitute six thematic working groups.



Towards operationalizing the recommendations for each thematic area, thematic working groups comprising representatives from line ministries/ departments, industry and industry associations, think tanks and experts have been constituted by the Ministry to develop an implementation framework for the recommendations given in the ICAP for each thematic area. A Steering Committee under the Chairpersonship of Secretary, MoEF&CC has also been constituted to guide and oversee the implementation framework and finalize the action points identified by the Thematic Working Groups for operationalizing the recommendations.

The thematic working group on Domestic Manufacturing and Production Sector – Alternative Refrigerants and technologies during its two meetings has identified a list of action points for operationalizing the recommendations of the ICAP. The action points have been identified after mapping the recommendations given in the ICAP with the on-going government programmes/ schemes handled by different ministries/ departments/agencies of the Government and inputs provided by the members during the meeting. Further, the action points were discussed in the meeting of the Steering Committee and were adopted during the meeting, which are tabulated in Table-1.

Table-1

Action points for operationalizing the recommendations of India Cooling Action Plant (ICAP) for the thematic area on Domestic Manufacturing and Production Sector – Alternative Refrigerants and technologies

Sr. No.	Recommendations on Domestic Manufacturing and Production Sector as per ICAP	Synergies to be made with existing governmental schemes/ programmes	Ministries/ Departments/ Agencies	Agreed Action	Remarks
1	2	3	4	5	6
Domestic manufacturing and Production Sector – Alternative Refrigerants and technologies					
1.	Develop safety standards for flammable refrigerants considering IEC60335-2-40 and IEC60335-2-89	Existing standards of BIS: i. IEC 60335-2-40 – safety of household and similar electrical appliances/safety part 2-40: particular requirements for electrical/ heat pumps, air conditioners and dehumidifiers (under revision based on ongoing study on safe use of HC-290). ii. IS 16656:2017/ ISO 817: 2014 iii. IS 16678 (part 2): 2018/ ISO 5149 Pt 2: 2014 iv. Refrigerating Systems and Heat Pumps- Safety and Environmental Requirements Part 2 Design, Construction, Testing, Marking and Documentation v. IS16678 (Part 3): 2018/ ISO 5149-3: 2014 vi. IS16678 (Part 4): 2018/ ISO 5149-4: 2014: Refrigerating Systems and Heat Pumps- Safety and Environmental Requirements Part 4 Operation, Maintenance, Repair and Recovery. vii. IEC 60335-2-89: 2010 – Household and similar electrical appliances – Safety Part 2-89: particular requirements for Commercial Refrigerating appliances with an incorporated or remote Refrigerant Unit or Compressor. New standard under development • Standard on 'Closed-circuit Ammonia Refrigeration System – Code of Practice for Design and Installation'	• Bureau of Indian Standards (BIS) • CSIR-NPL • Ministry of Consumer Affairs	• BIS to periodically update IEC 60335-2-40 and IEC 60335-2-89w.r.t. safe use of A3, A2 and A2L flammable refrigerants. • BIS to develop safety standards for flammable refrigerants considering IEC60335-2-40 based on simulation study carried out by IIT Delhi • BIS to develop standards for specifications (for quality assurance of refrigerants in line with AHRI 700, 700C and 700E. • Ministry of Consumer Affairs to issue an advisory for mandatory adoption of purity check of refrigerants available in the market in order to prevent spurious refrigerants. • Standardization of testing and calibration of equipment for checking purity of refrigerants by CSIR-NPL	IIT Delhi has undertaken a simulation study for development of national standards by BIS for low-GWP Refrigerants in association with Ozone Cell, MoEF&CC. BIS formed a panel including representative of IIT Delhi for updating standard 60335-2-40. Communication sent to Ministry of Consumer Affairs for BIS to take necessary action, as part of the recommendations from the Workshop on Indigenous capacity development including research on low global warming potential (GWP) chemicals held on 4 August 2023. CSIR-NPL is primary custodian of Standards (NMI) in India. CSIR-IICT in collaboration with CSIR-NPL and BIS may help development of Certified Reference Standards for Refrigerants

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2.	Development and production of low-GWP alternative refrigerants to the widely used high–GWP HFCs like R-404A and R-407C	DST is in consultation with stakeholders on the development of low GWP alternate refrigerants. Based on the outcomes. DST will formulate a roadmap for R&D support.	• Ministry of Science and Technology and its allied institutions including CSIR • IITs • Refrigerant Gas Manufacturers Association (REGMA	• Promote invention/ discovery, development and production of next generation low GWP and low flammable refrigerants including blends by CSIR-IICT, IITs and refrigerant producers. • CSIR-IICT to complete the ongoing project sponsored by DST relating to development of HFO-1234yf.	Low GWP blends including pilot scale HFO 1234yf have been developed by one of the refrigerant producers in the country. CSIR-IICT has undertaken development of low GWP alternative technologies to HFCs with the financial support of DST. CSIR-IICT has developed a laboratory scale process for HFO-1234yf with the financial support of DST. DST is in consultation with stakeholders on the development of low GWP alternate refrigerants.
3.	Indigenous development and initiation of production of HFOs and low-GWP blends of HFO and HFCs				
4.	Commercial Scale production of HFOs		• DCPC and MoPNG	• Promote indigenous development of R-290 and R-600a	Communication sent to DCPC and MoPNGas part of the recommendations from the Workshop on Indigenous capacity development including research on low global warming (GWP) chemicals held on 4 August 2023.
5.	Amendment of the Ozone Depleting Substances (Regulation and Control) Rules 2000 to align with the Kigali Amendment to the Montreal Protocol and its implementation	Ozone Depleting Substances (Regulation and Control) Rules, 2000 and its amendments under the Environment Protection Act. So far ODS Rules have been amended 7 times in 2001, 2003, 2005, 2007, 2014 and 2019.	Ozone Cell, MoEF&C	• Ozone Cell, MoEF&CC to amend the Ozone Depleting Substances (Regulation and Control) Rules 2000 to align with the Kigali Amendment to the Montreal Protocol and its implementation, in consultation with all the industry stakeholders.	To be updated once the national strategy for HFC phase down is developed.

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6.	Monitoring and enforcement of Regulations of Petroleum & Explosives Safety Organization (PESO) with respect to the use of disposable cylinders	Gas Cylinder Rules, 2016	• Petroleum & Explosives Safety Organization (PESO) • REGMA	**PESO to develop monitoring mechanism with respect to disposable refrigerant cylinders under the existing Gas Cylinder Rules, 2016 and enforce the same.** **PESO to develop real time tracking mechanism for refrigerant cylinders.**	PESO informed that The manufacture, filling, possession, import and transport of cylinders including Valves/ Regulators fitted on the cylinders are covered under The Gas Cylinder Rules, 2016 notified under the Explosives ACT, 1884. The non-refillable cylinders are not approved under the Gas cylinders Rules, 2016 for use in India. The rules are required to be amended suitably for introduction of non-refillable cylinders in India. Globally the non-refillable cylinders are manufactured as per international standards i.e. DOT 39, ISO 11118:2015 etc. As per the above standards, the maximum developed pressure of the contents inside the cylinder is considered as 54.5 degree C, whereas India being a tropical country the developed pressure is considered as 65 degree C. As such the non-refillable cylinders conforming to DOT 39 or ISO 11118:2015 are not suitable for India. There is a need to develop Indian standards considering the tropical conditions in the country. Non refillable cylinders are designed for one time use, they are not designed to be refilled. Once empty, these cylinders – which have thin walls weakened by stress of refilling – should be recycled or disposed of properly. Refilling of such cylinders may cause explosion.

WHOM TO CONTACT TO LEARN MORE ABOUT OZONE

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